Honeywell

R7500C Wide Range Proportional Temperature Controller

INSTALLATION INSTRUCTIONS

BEFORE INSTALLATION

Refer to job drawings for specific installation information and mounting location. Main and compensation sensors (when used) must be 500-ohm Balco sensors (L7022, L7025, L7033, T7506 or T7001).

This controller is surface mounted through the two holes in the back of the case.

Observe ambient temperature (30 to 140F) (0 to 60C) and relative humidity (5 to 95%) limitations.

No special tools are required to install this controller.

⚠ CAUTION:

This controller requires a 11 to 12V dc power supply for proper operation. The power may be supplied by an R7503 Modutrol* Motor Converter, R7504 Two-Position Converter, RP7505 Pneumatic Transducer, Electronic Modutrol Motors M734K or M745J, any other device designed for use with this Temperature Controller, or a separate dc power supply. This controller outputs 4 to 7 Vdc across the proportional band setting. It is designed to work with motors and actuators that expect a 4 to 7 Vdc input signal.

MOUNTING

This controller can be surface mounted in any convenient location such as on duct walls, end compartments of unit ventilators, etc.

They are fastened to the mounting surface through the two diagonally opposed mounting holes in the back of the case. See Fig. 1.

For access to the mounting holes, remove the cover from the case by loosening the cover mounting screw.

The mounting holes are now visible through the circuit board notches in the upper right and lower left-hand corners.

Determine placement of the mounting holes in the surface and scribe the mounting hole locations. Drill pilot holes and fasten with No. 10 screws.

Fig. 1. Approximate Installation Dimensions in inches (Millimeters).

WIRING

All wiring must agree with local electrical codes and ordinances.

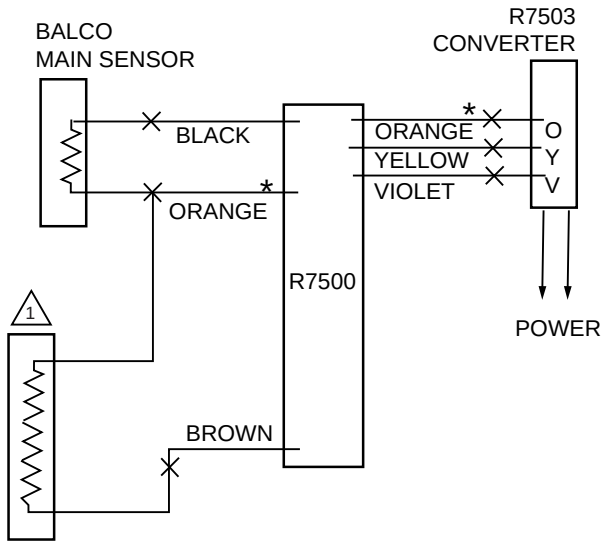
Since the Controller circuits are rated NEC Class 2, some local codes allow open (no conduit) wiring.

Number 18 gage 1.0 mm insulated wire or two- or three-conductor thermostat cable is acceptable for use with these Controllers, except on long sensor or remote setpoint potentiometer runs where a larger wire size should be used. See Table 1.

All control wiring connections to the Controller are made to the 6-inch (152 mm), color-coded leadwires found bundled under the cover. There are two orange wires to facilitate connections to the converter and/or sensors.

Crimp type connectors are recommend for field connections of the control wiring. Refer to job drawings for specific wiring information. See Figures 2 through 4 for some typical wiring diagrams.

IMPORTANT
Observe color-coding of wires when making connections.



* BOTH ORANGE WIRES ARE ELECTICALY IDENTICAL.

△1 OPTIONAL DISCHARGE COMPENSATION SENSOR. SUBSTITUTE WITH 500 OHM RESISTOR WHEN COMPENSATION IS NOT USED.

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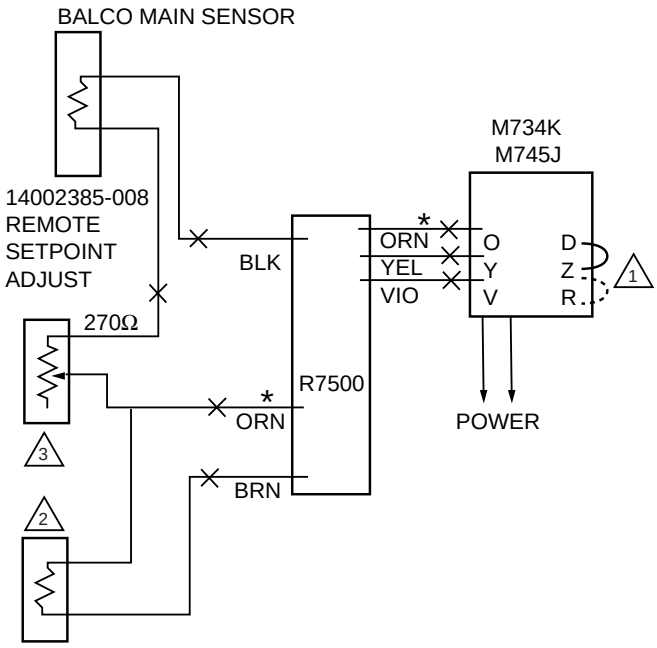
Fig. 2. Typical Hookup Diagram of R7500C Model with Integral Setpoint Adjustment.

NOTE: When the compensation sensor is not used, substitute a 500-ohm resistor and set the compensation ratio at the maximum setting (20).

Table 1. Wire Resistance, Ohms per 1,000 Feet (304m).

Wire Gage	Wire Dia. Size (mm)	Ohms/1000 ft (304 m) of Wire
18	1.00	6.5
16	1.25	4.0
14	1.60	2.6
12	2.00	1.6
10	2.50	1.0

When determining proper wire size, remember there are two wires to the sensor and the setpoint potentiometer. Double the distance to the sensor or potentiometer to obtain the proper wire length. Calibration of the controller will be offset approximately 1F (0.5C) for every one ohm of lead wire resistance.



△1 CONNECT Z-D FOR DIRECT ACTION; Z-R FOR REVERSE.

△2 OPTIONAL DISCHARGE COMPENSATION SENSOR. SUBSTITUTE WITH 500 OHM RESISTOR WHEN COMPENSATION IS NOT USED.

△3 MOVE WIPER UP TO RAISE SETPOINT.

* BOTH ORANGE WIRES ARE ELECTRICALY IDENTICAL.

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Fig. 3. Typical Hookup Diagram of R7500C with Remote Temperature Selector.

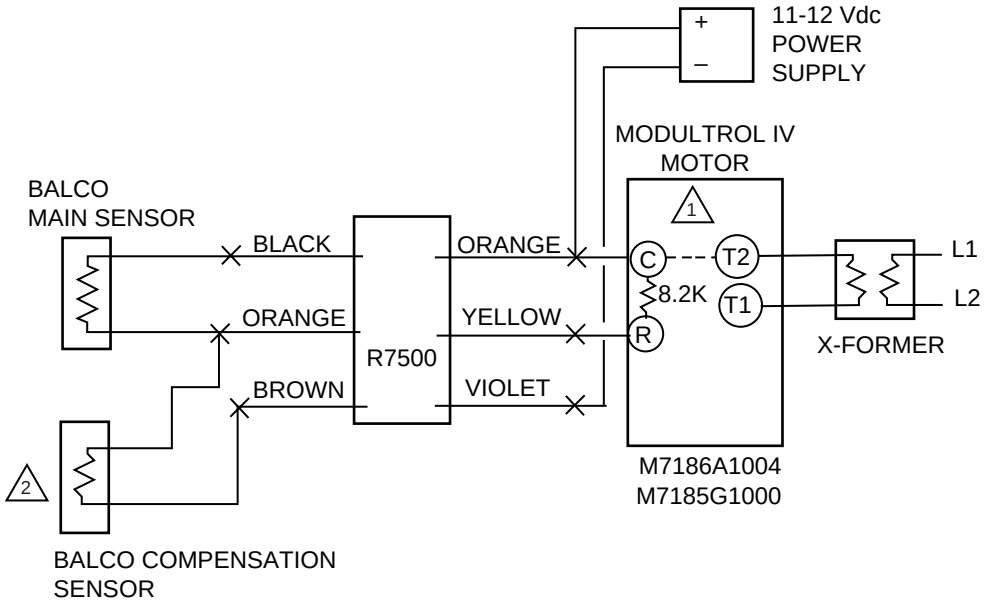

Fig. 4. Hookup Diagram of R7500 to Modutrol IV Motors.

ADJUSTMENTS & CALIBRATION

ADJUSTMENTS

Set the following adjustments as specified on job drawing or as required.

TEMPERATURE SETPOINT ADJUSTMENT

Integral setpoint adjustment is provided on the R7500C. When it is desired to use a remote setepoint adjustment, set the integral setpoint adjustment knob to the same temperature as the top end of the remote setpoint scale. When using the 14002385-008 remote setpoint assembly, set the integral setpoint knob to REMOTE. Calibration of the remote potentiometer will then be correct.

PROPORTIONAL BAND (PB) ADJUSTMENT

This adjustment indicates the change in temperature required at the sensor to move the final control device (i.e., valve, damper) from one extreme position to the other (full on to full off). The controller has the highest gain with the lowest PB setting.

Fig. 5. View of R7500C with Cover Removed Showing Adjustment Locations.

COMPENSATION RATIO ADJUSTMENT

Compensation ratio is the number of degrees temperature change required at the compensation sensor to change the primary sensor control point one degree F.

When a compensation sensor (T2) is used, the compensation ratio adjustment provides a means for adjusting the effect of the compensation sensor on the primary sensor (T1). For example, with a compensation ratio setting of 10, a 10 degree F drop in temperature at the compensation sensor is required to increase the controlled temperature 1 degree F.

This adjustment has a range of 0.25 to 20. A blank table provided in the controller is for noting the compensation schedule.

Use the formula below to calculate the compensation ratio for hot water reset applications:

$$\text{Comp. Ratio} = \frac{\text{Change in outside air temp.}}{\text{Change in hot water temp. + P.B.}}$$

Adding P.B. to the change in hot water temperature compensates for proportional offset.

CALIBRATION

The R7500 family of controllers are factory calibrated and checked prior to shipment and should operate satisfactorily on job startup.

If the sensor and/or the setpoint potentiometer are a long distance from the controller, it may be necessary to recalibrate the controller. Calibration potentiometers are behind the three holes on the left side of the front panel, see Figure 6. To compensate for main sensor and/or setpoint potentiometer lead wires or calibration, adjust the middle potentiometer R7 (Cal. Pot. No. 2) clockwise. This compensates for leadwire length and a controlling temperature which is lower than the setpoint. (3.5 degrees of rotation per ohm of leadwire resistance or per degree off-calibration).

To compensate for the compensation sensor leadwire resistance, adjust the top left potentiometer R1 (Cal. Pot. No. 1) clockwise. (3.2 degrees of rotation per ohm of leadwire resistance or per degree off-calibration.) Cal. Pot. No. 1 also can be used to vary the compensation start point (temperature at which compensation affect is zero). The factory compensation start point setting is 70F. Turning Cal. Pot. No. 1 CCW lowers the compensation start point temperature.

CHECKOUT AND TESTING

CHECKOUT

The only checkout ordinarily required is to slowly rotate the Setpoint Adjustment through the total proportional band of the device to determine if the output devices operate properly.

If the system does not function properly or the controller appears to be out of calibration, proceed with the following testing information.

TESTING

Before testing, be sure the Controller power supply (11 to 12 Vdc) is present at test point (+) and (–1) of R7500 models. If the correct supply voltage is not available at these points, check the power input device as indicated in the literature accompanying the applicable unit.

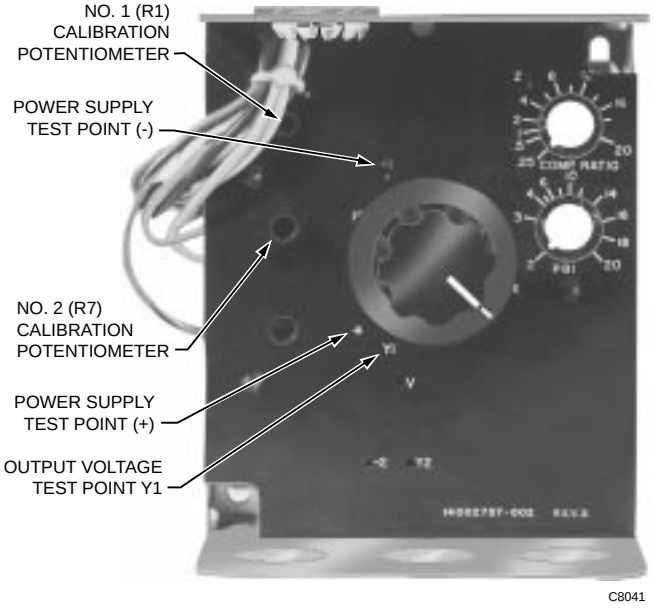

Fig. 6. Test Points and Calibration Adjustment Locations.

All R7500 series of controllers include test points on the left side of the front panel (see Fig. 6). All Controllers have the following points—

Y1 = Output voltage (yellow leadwire)
–1 = Power supply (–), (violet leadwire)
\+ = Power supply (+), (orange leadwire)

Using the appropriate scale voltmeter, insert test probes into appropriate holes for voltage checks.

NOTE:

1. To ensure correct voltage readings in the following tests, a 500-ohm resistor should be substituted for the compensation sensor (if its temperature is not near 75F [24C]) and “comp. ratio” should be set at 20.
2. If the controller output is not connected, wire a 390 ohm “load” resistor from orange to yellow wires.

R7500

Adjust setpoint knob to correspond to the ambient temperature at the main sensor. Set the proportional band at 5. The output voltage between points Y1 and (+) should be approximately one-half power supply voltage minus 0.6 Vdc. If this reading is not found, the device can be recalibrated by adjusting the calibration potentiometer No. 2 (left center of panel, see Fig. 6) until this reading is reached.

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